SBI3U

Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Respiratory Lab**

**Introduction:** Human lung capacity can be measured in several ways. One way, is by using a piece of laboratory equipment called a spirometer. Several different lung volume measurements can be made. The largest possible amount of air that can be exhaled after drawing a deep breath, is the **vital capacity**. The amount of air that remains in the lungs after exhaling normally but which can be expelled is the **expiratory reserve**. The amount of air taken in or expelled during normal breathing is called the **tidal volume**. A certain amount of air in the lungs cannot be expelled. This is the **residual volume**.

There are many human characteristics and behaviours that can influence a person’s lung capacity such as gender and size or habits such as amount of exercise or smoking.

**Purpose:** This lab will investigate the lung capacity, breathing rate and the factors that affect it

**Procedure:** Go through Stations 1 through 5 to complete your organizer (attached) and answer the questions that follow

**Question**

1) Why is it important to measure tidal volume and vital capacity three times and then get an average?

2) Why must inspiratory reserve volume be calculated and not measured?

3) Once you examine the class data, how does your Vital Lung Capacity compare to the class average?

4) How might an athlete’s vital capacity compare to a non-athlete? Explain your reasoning.

5) Define *respiratory surface.*

6) At the respiratory surface, what process actually causes O2 to go into the blood and CO2 to go out of the blood? Relate this to the Station 5 activity (hint: Hopefully, there is a higher concentration of O2 in the air you breathe than in the blood when you inhale)

7) What is the benefit of having so many tiny alveoli rather than one big air sac?

Application

8) Examine the data table of a person who entered into a training program. This person’s vital capacity

was measured over a 60 day period. Use the data to construct the graph.

9) What happened to the person’s vital capacity over the course of the training period?

|  |  |
| --- | --- |
| Day of Training | Vital Capacity |
| 0 | 4800 |
| 10 | 4840 |
| 20 | 4890 |
| 30 | 4930 |
| 40 | 4980 |
| 50 | 5180 |
| 60 | 5260 |

10) What probably caused the change?

11) How might vital capacity be important to a musician?

FOR HOMEWORK!

12) Using the class data create 5 graphs in Excel or Google Docs, relating each factor to Vital Lung Capacity, you can choose between line graphs or bar graphs. Make your choices based on the nature of the data and make sure to label axis correctly, with category and units as well as including an appropriate title for each graph.

13) Referring to your graphs, evaluate your predictions and discuss how each factor affected (or not) vital lung capacity.